CLAIMS

1. Procedure for the analysis of the access to a data communication network by a user (LAN), characterised by the fact that it comprises the operations of tracing (A1) the traffic of said user (LAN), and identifying a group of networks with which said traffic is mainly handled, by defining (100) relative autonomous systems (AS) and tracing the sequence of autonomous systems crossed by said traffic; the tracing operation of said sequence including:

- a first stage (B1), to provide the list (102) of the paths of autonomous systems crossed by said traffic to reach each destination, and

- a second stage (B2), to aggregately elaborate said list of paths, outputting a tree representing all the paths of the autonomous systems crossed by the traffic of said user (LAN) to reach all corresponding destinations.

2. Procedure as per claim 1, characterised by the fact that it comprises the operation of determining the routing of said traffic on the branches of said tree, and the operation of associating the respective indicative values of the traffic that crosses the branch to the branches of said tree.

3. Procedure as per claim 1 or claim 2, characterised by the fact that it comprises the operation of using hardware probes to trace the traffic of said user.

4. Procedure as per claim 3, characterised by the fact that it comprises the operation of configuring said

hardware probes to provide information selected in the group consisting of: band use of the individual link, data volume, protocol-subdivision, IP address-subdivision, traffic matrix between the user (LAN) and the network .

5. Procedure as per claim 3 or claim 4, characterised by the fact that it comprises the operation of configuring said hardware probes to determine at least one selected item in the group consisting of: sites most frequently visited by the user, main networks to which the user addresses its traffic, and the origin of who connects up to said user.

6. Procedure as per claim 1 or claim 2, characterised by the fact that it comprises the operation of setting software agents on the data communication network access routers to trace said user traffic.

7. Procedure as per claim 6, characterised by the fact that it comprises the operation of configuring said software agents to trace the traffic through the interface of the router of said user to determine the main traffic lines.

8. Procedure as per claim 6, characterised by the fact that it comprises the operation of configuring said software agents to analyse the operating status of the respective router in terms of CPU load and available memory.

9. Procedure as per claim 6, characterised by the fact that it comprises the operation of providing a target

machine for the transfer of the statistics obtained by said routers.

10. Procedure as per claim 1, characterised by the fact that it comprises the operation of generating, as the result of said traffic tracing operation of said user, at least one parameter selected from the group consisting of: destination networks of said traffic, percentage of traffic involved, pertinent autonomous system.

11. Procedure as per claim 1, characterised by the fact that said first stage (B1) comprises the operations of inputting a file containing the IP addresses representing the sites most frequently visited by said user and performing a traceroute function for each destination site, by tracing the path to reach this destination.

12. Procedure as per claim 11, characterised by the fact that it comprises the operation of tracing said path as a sequence of autonomous systems (AS) crossed.

13. Procedure as per claim 11, characterised by the fact that in said first stage said tracing operations are carried out repeatedly with a given frequency.

14. Procedure as per claim 13, characterised by the fact that said frequency can be determined and selected.

15. Procedure as per claim 1, characterised by the fact that said second stage (B2) comprises the operation of generating a unique tree of paths of the autonomous systems crossed by the traffic of said user to reach all the

destinations, the leaves of said tree being indicative of the destination subnetworks of the traffic of said user.

16. Procedure as per claim 1, characterised by the fact that said second stage (B2) comprises the operation of providing, in relation to the list of said autonomous systems crossed by said traffic of said user, at least one parameter from: the percentage of use of the autonomous system, a time value for passing through said autonomous systems and a hops value inside the autonomous system.

17. Procedure as per claim 16, characterised by the fact that at least one and preferable all said data provided are expressed as an average value.

18. Procedure as per claim 1 or claim 11, characterised by the fact that said first stage (B1) comprises the operation of invoking for each IP address generated via said traceroute function, a remote service to obtain at least one item of the information included in the group consisting of: name of the autonomous system to which the generated IP address belongs and the number of the autonomous system to which said generated IP address belongs.

19. Procedure as per claim 18, characterised by the fact that said remote service is the *whois* service of the databases RIBE, ARIN, APNIC.

20. Procedure as per claim 1, characterised by the fact that said first stage (B1) comprises the operation of

generating a data file (103) comprising information selected from the group consisting of:

- order number of the autonomous system following the sequence of IP addresses provided by said traceroute function,
- text name of the autonomous system,
- identification number of the autonomous system,
- number of hops that a single tracing command has measured inside the autonomous system, and
- time of permanence in the autonomous system measured by a single tracing command.

21. Procedure as per claim 1 or claim 11, characterised by the fact that it comprises the operation of performing a plurality of said tracing functions in parallel during said first stage.

22. Procedure as per claim 1, characterised by the fact that said second stage (B2) comprises the operation of storing information of correspondence between IP addresses and the data relating to the pertinent autonomous systems.

23. Procedure as per claim 1, characterised by the fact that said second stage (B2) comprises the operation of generating the leaves of said tree as identification of the destination subnetworks of the traffic of said user and the relative branches as identifications of the autonomous systems crossed by the traffic.

24. Procedure as per claim 1, characterised by the fact that said second stage (B2) is performed in association

with a central memory with a data structure that represents the paths generated in said first stage in the form of at least one aggregated list.

25. Procedure as per claim 24, characterised by the fact that the said at least one aggregated list is identified as representing a variable number of autonomous system lists that share a common maximum prefix.

26. System for the analysis of the access to a data communication network by a user (LAN), characterised by the fact that the system is configured to trace (A1) the traffic of said user (LAN) and identify a group of networks with which this traffic is mainly involved, by identifying (100) relative autonomous systems (AS) and tracing the sequence of autonomous systems crossed by said traffic; to trace said system the system including a first module (B1) that provides the list (102) of paths of autonomous systems crossed by said traffic to reach each destination, and a second module (B2) to aggregately elaborate said list of paths by outputting a tree representing all the paths of the autonomous systems crossed by the traffic of said user (LAN) to reach all relative destinations.

27. System as per claim 26, characterised by the fact that the system is configured to measure the routing of said traffic on the branches of said tree and associate respective indicative values of the traffic crossing the branch to the branches of said tree.

28. System as per claim 26 or claim 27, characterised by the fact that it comprises hardware probes to trace the traffic of said user.

29. System as per claim 28, characterised by the fact that said hardware probes are configured to supply information selected in the group consisting of: use of single link band, data volume, protocol-subdivision, IP address-subdivision, traffic matrix between the user (LAN) and the network.

30. System as per claim 28 or claim 29, characterised by the fact that said hardware probes are configured to determine at least one item selected in the group consisting of: sites most frequently visited by the user, main networks addressed by the user traffic, origin of those who connect up to said user.

31. System as per claim 26 or claim 27, characterised by the fact that it comprises software agents on the data communication network access router to trace the said traffic of the user.

32. System as per claim 31, characterised by the fact that said software agents are configured to trace the traffic through the interface of the router of said user by determining the main traffic lines.

33. System as per claim 31, characterised by the fact that said software agents are configured to perform an analysis on the operating status of the respective router in terms of CPU load and available memory.

34. System as per claim 31, characterised by the fact that it comprises a target machine for the transfer of the statistics obtained by said routers.

35. System as per claim 26, characterised by the fact that it is configured to generate as the result of said tracing operation of the traffic of said user at least one of the parameters selected from the group consisting of: destination networks of said traffic, percentage of traffic involved, pertinent autonomous system.

36. System as per claim 26, characterised by the fact that said module (A1) is configured to input a file containing the IP addresses representing the sites most frequently visited by said user and to perform a tracing operation (traceroute) to this destination for each destination site, by tracing the path to reach this destination.

37. System as per claim 36, characterised by the fact that said first module is configured to trace said path as a sequence of autonomous systems (AS) that are crossed.

38. System as per claim 36, characterised by the fact that said first module is configured to repeatedly perform said tracing operations with a given frequency.

39. System as per claim 38, characterised by the fact that said first module is configured so that said frequency can be determined and selected.

40. System as per claim 26, characterised by the fact that said second module (B2) is configured to output a

unique tree of autonomous systems paths crossed by the traffic of said user to reach all the destinations, the leaves of said tree being indicative of the destination subnetworks of the traffic of said user.

41. System as per claim 26, characterised by the fact that said second module (B2) is configured to provide, in relation to the list of said autonomous systems crossed by said traffic of said user, at least one parameter from: the percentage of use of the autonomous system, a value of time of permanence inside said autonomous systems and a value of hops inside said autonomous system.

42. System as per claim 41, characterised by the fact that at least one and preferably all said data provided are expressed as an average value.

43. System as per claim 26 or claim 36, characterised by the fact that said first module (B1) is configured to invoke for each IP address generated via said tracing function (traceroute), a remote service to obtain at least one of the following pieces of information included in the group consisting of: name of the autonomous system to which the generated IP address belongs and number of the autonomous system to which the aforesaid generated IP address belongs.

44. System as per claim 43, characterised by the fact that said remote service is the *whois* service of the databases RIBE, ARIN, APNIC.

45. System as per claim 26, characterised by the fact that said first module (B1) outputs a data file (103) including information selected in the group consisting of:

- order number of the autonomous system following the sequence of the IP addresses provided by said tracing function,
- text name of the autonomous system,
- identification number of the autonomous system,
- number of hops that a single tracing command has measured inside the autonomous system, and
- time of permanence in the autonomous system measured by a single tracing command.

46. System as per claim 26 or claim 36, characterised by the fact that said first module is configured to perform in parallel a plurality of said tracing functions.

47. System as per claim 26, characterised by the fact that said second module (B2) contains a cache memory to store information of correspondence between IP addresses and data relating to the pertinent autonomous systems.

48. System as per claim 26, characterised by the fact that said second module is configured so that the leaves of said tree are the destination subnetworks of the traffic of said user and the relative branches are the autonomous systems crossed by the traffic.

49. System as per claim 26, characterised by the fact that said second module (B1) is associated to one central memory with a data structure that represents the paths

generated by said first module in the form of at least one aggregated list.

50. System as per claim 49, characterised by the fact that the said at least one aggregated list is identified as representing a variable number of autonomous system lists (VAS) that share a common maximum prefix.

51. Computer program product directly loadable in a numerical processor internal memory and including parts of software code to implement the procedure as per any one of the claims 1 to 25 when the product is run on a processor.